

Application of the Problem-based Learning (PBL) Model with Kokami Media to Improve Students' Activity and Learning Achievement

Agung Nugroho^{a*}, Anggun Pria Wibowo^b, Nurul Aini Syifa^a

^aUniversitas Muhammadiyah Purwokerto, Purwokerto, Indonesia; ^bUniversitas Tanjungpura, Pontianak, Indonesia

*Corresponding: agungnugrohoump@gmail.com

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Abstract

Student engagement in the learning process is one of the keys to achieving educational goals. Students who are actively engaged tend to understand lesson material more easily because they are directly involved in the process of thinking, discussing, asking questions, and solving problems. This engagement not only helps students master knowledge but also builds critical thinking skills, collaboration, and self-confidence. The research aims to improve the activity and learning achievement of fifth-grade students at SD Negeri Buntu 02 through the application of the Problem-Based Learning model assisted by KOKAMI media. This type of research is known as classroom action research (CAR) and was conducted in two cycles with two meetings in each cycle. The research procedure used the Kemmis & McTaggart model, which includes planning, implementing actions, observation, and reflection. The subjects of this study were 18 fifth-grade students at SD Negeri Buntu 02, consisting of 12 male students and 6 female students. The testing instruments were evaluation sheets, and the non-testing instruments were observation sheets and student learning activity sheets. Student activity scale data were obtained through student activity observation sheets, and student learning achievement data were obtained through evaluation sheets. Based on the research results, learning activity in Cycle I reached an average of 2.19, and in Cycle II, it reached an average of 3.19. The improvement in student learning achievement in mathematics on the subject of spatial volume in cycle I was 66.90 and in cycle II increased to 76.25, while student learning completeness in cycle I was 61.00% and in cycle II increased to 83.25%. Based on the research results, it can be concluded that the application of the Problem-Based Learning model assisted by KOKAMI media can improve the activity and learning achievement of fifth-grade students at SD Negeri Buntu 02.

Keywords

Problem-based learning; KOKAMI media, engagement, learning achievement

Introduction

Mathematics is one of the fields of study that has a real relationship with the world situation and has a significant influence on it. However, in reality, mathematics is still viewed as something difficult at all levels of education. Many students think that learning

mathematics is boring. As a result, students often behave passively when learning, which also reduces their positive achievements. According to (Putri & Firmansyah, 2020) the average mathematics score is below the minimum competency standard (KKM), indicating low student learning achievement. Low student participation in class is one of the factors contributing to the limited positive achievements attained by students.

The level of activity shown by students when learning, known as engagement, varies depending on the type of activity, the subject matter covered, and the objectives to be achieved. Student involvement in active learning activities during their studies is a sign of their motivation to learn. Learning achievement is the final outcome of what students have learned from the information they have obtained during their studies (Zega et al., 2021). The learning outcomes achieved by students during a series of learning activities determine their learning achievement. Teachers contribute to the series of learning activities or instructional methods applied to measure student learning achievement by ensuring that they are involved in the session. Activeness is an attractive quality that a teacher must possess in order to dynamize learning activities so as to arouse student interest, make learning activities enjoyable, and experience an increase in learning achievement.

Based on observations conducted during learning activities by students in grade V of SD Negeri Buntu 02, teachers applied lecture, question and answer, and assignment strategies during the series of learning activities. The learning scenarios were quite varied, but observations showed that only about 60% of students participated in group activities, resulting in unstructured student interaction. The use of media in learning was also limited, which meant that student activity was not yet optimal. In addition, many students still did not understand the lesson material but were reluctant to contact their teachers or peers for help. Other information obtained by the researcher during interviews with fifth-grade teachers was that the mathematics learning achievements of a number of students were less than optimal. The school's minimum passing grade is 70, while the average student score is below 70, at 65.

Based on these conditions, changes must be made to improve teaching standards. Learning activities must be planned and implemented according to the characteristics of each student to increase student activity when participating in a series of learning activities. Educators must create a pleasant learning environment. One way to encourage students to participate in a series of learning activities is by implementing a learning

activity model that consists of various types (Riswati et al., 2018:454). Based on the above, it can be concluded that the limitations of conventional teaching methods and the lack of variety in media result in low student engagement and academic achievement. Therefore, more interesting, interactive, and student-centered learning innovations are needed to encourage their active participation. By implementing varied learning models and using supportive media, it is hoped that a more enjoyable learning atmosphere can be created and student learning outcomes can be improved.

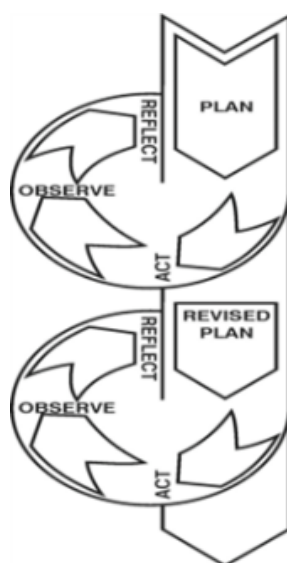
The use of media and learning models is the main focus of a teacher in the classroom to develop learning activities. Problem-Based Learning (PBL) model is a cooperative learning model that requires students to be active and motivates them to support and help each other in mastering the subject matter being studied. According (Anazifa, 2016), PBL is a teaching strategy that helps students identify problems that arise at the beginning of learning activities and develop their capacity to formulate questions that will help them understand the problems more thoroughly. Additionally, making adjustments through the creation of learning activity materials is one of the techniques to improve the learning atmosphere. Several studies have proven that the implementation of the problem-based learning model has a positive impact on students' academic performance, critical thinking skills, and literacy skills (Adam Arya Nugraha, Heni Purwati, Lilik Ariyanto, 2023), (Widowati et al., 2021), (Qondias, 2022), (Anggraeni & Adha, 2023), (Shabrina & Nugroho, 2024).

Learning media also plays a key role in the success of the learning process in the classroom. Engaging media naturally increases student activity during learning activities. According to (Faturrahman et al., 2021) the presence of media can create a fresh learning environment that elicits positive responses from students. Therefore, it is important to create learning activity media that can attract users' interest and actively involve students, one of which is the mystery card box (KOKAMI) media. The mystery card box media is a box-shaped medium designed according to mathematics material. The material for this medium can be made of cardboard or wooden boards decorated in such a way as to be attractive. Numerous studies have examined the use of mystery box media or mystery card box media, and the results indicate that mystery card box media significantly impacts improvements in student performance and learning activity (Nuril Mu'minah, 2022), (Simamora et al., 2019), (Indri Yani, 2020).

The application of the PBL model and KOKAMI media innovation will be integrated into student learning activities. This media can assist teachers in disseminating the information being learned and motivate participants to engage in learning activities. According to (Satriawan et al., 2021) the availability of facilities that serve as auxiliary tools in learning activities can stimulate learning interest and lead to positive improvements in academic performance. The media used through direct student activities makes learning more enjoyable, facilitates understanding of the material, and fosters student enthusiasm (Putri Assani Rohmatus Sa'adah & Agung Nugroho, 2020). The purpose of this study is to identify whether the implementation of the Problem-Based Learning (PBL) model with the assistance of KOKAMI media can increase student learning activity in mathematics lessons.

Method

The research conducted was Classroom Action Research, with data obtained from direct observation of the learning activities in the classroom. The research was conducted in two cycles, namely Cycle I and Cycle II. This research took place in Grade V of SD Negeri Buntu 02, with a total of 18 students, consisting of 12 male students and 6 female students. In this classroom action research, the researcher applied the model developed by Kemmis and McTaggart. The stages of this research are 1) Planning, 2) Action, 3) Observation, and 4) Reflection. The research cycle (Kemmis & Mc. Taggart, 1982:8) can be described as follows.



The data collection instruments used in this study were observation sheets and evaluation test sheets. Based on the observation sheets, the researchers observed what happened during the learning activities and recorded their observations by giving a score of 1 in the column on the observation sheet. The second observation sheet was used to observe student activity. The researcher assigned scores of 1/2/3/4 on the evaluation sheet according to the level of student activity. The evaluation test sheet consisted of evaluation questions created by the researcher to measure the variable of student learning achievement.

Result

Based on the findings of the research conducted over two cycles, from Cycle I to Cycle II, there was an increase in student activity and academic achievement. The implementation of the Problem-Based Learning model assisted by KOKAMI media can have a positive impact on efforts to increase student activity and academic achievement in mathematics, specifically in the subject of spatial volume. The increase in student activity and academic achievement can be seen from observation data and evaluation score summaries.

Learning Activity

Teachers' ability to conduct learning activities effectively was not good in cycle I. At the beginning of the activity, teachers did not motivate students to learn. In addition, teachers did not provide reflection at the end of the class. When the learning activity began, students' attention was not fully focused on the material, and this continued until the core activity. Students were still reluctant to answer questions in the first meeting. In the second meeting, students were still seen playing on their own and talking a lot, making the atmosphere less conducive.

Table 1 Results of Student Activity in Cycles 1 and 2

Indicator	Cycle 1		Average	Cycle 2		Average
	P1	P2		P1	P2	
Participate in carrying out learning tasks	2,38	2,61	2,49	3,38	3,61	3,49
Participate in problem solving	1,78	2,27	2,02	2,83	3,22	3,02
Students are willing to ask questions if they do not understand the problem they are facing	1,67	2,16	1,91	2,83	3,05	2,94
Bravely gather the knowledge needed to solve the problem	2	2,22	2,11	3,22	3,33	3,27
Able to conduct group discussions according to teacher instructions	1,89	2,33	2,11	3,05	3,5	3,27
Able to find solutions to similar problems or issues	2,27	2,67	2,47	2,94	3,38	3,16
Amount	11,99	15,03	13,51	18,25	20,09	19,17
Average	2,02	2,37	2,19	3,04	3,35	3,19
Criteria	Enough		Good			

Description: P1 = Meeting 1, P2 = Meeting 2

In cycle II, teachers assisted researchers in developing additional plans for cycle II learning activities, including better classroom management through firmness and providing the best rewards to students based on the problems or weaknesses identified in cycle I. Observations of teachers' activities in cycle II showed that teachers were successful in implementing learning activities. Compared to cycle I, teachers' classroom management in cycle II improved significantly. With the implementation of the KOKAMI media-assisted problem-based learning model, teachers were able to explain and organize learning activities more clearly. Teachers also motivated their students to participate more actively in class. The following is a graph showing the efforts to increase student participation in learning:

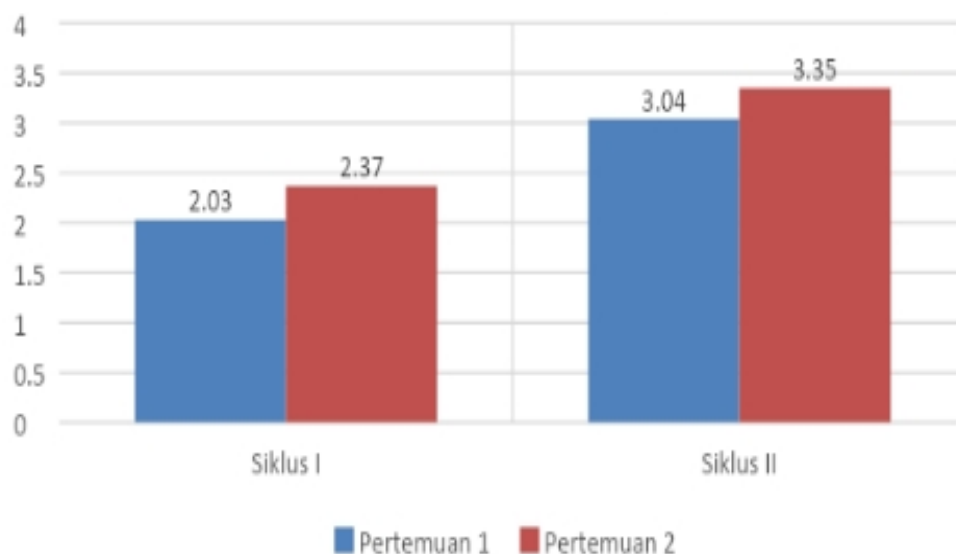


Figure 1. Histogram of Student Learning Activity Results

Based on the graph above, it shows that there is an increase in the variable of student learning activity in each cycle. In cycle I, student learning activity was 2.19 with a satisfactory criterion. Meanwhile, in cycle II, student learning activity was 3.19 with a good criterion.

Student Learning Achievement

The positive learning achievements of students improved from cycle I to cycle II. Students achieved these learning achievements while participating in learning activities.

Table 2 Results of Student Activity in Cycles 1 and 2

NO	Information	Cycle I		Cycle 2	
		P1	P2	P1	P2
1	Number of Students	18	18	18	18
2	Highest Score	90	100	100	100
3	Lowest Score	40	40	55	60
4	Number of Students Who Completed	10	12	14	16
5	Number of Students Who Didn't Complete	8	6	8	2
6	Total Score	1185	1225	1355	1390

7	Average per Meeting	65,8	68	75,3	77,2
8	Learning Completion per Meeting	55%	66,7%	77,7%	88,8%
9	Learning Completion in Cycle	61%		83,25%	

Description: P1 = Meeting 1, P2 = Meeting 2

Based on the results of the study, it is known that learning activities that apply the KOKAMI media-assisted Problem-Based Learning model can improve student learning achievement. These results can be obtained from the evaluations that have been carried out at each meeting. A summary of student learning achievement scores can be seen in the Figure 2.

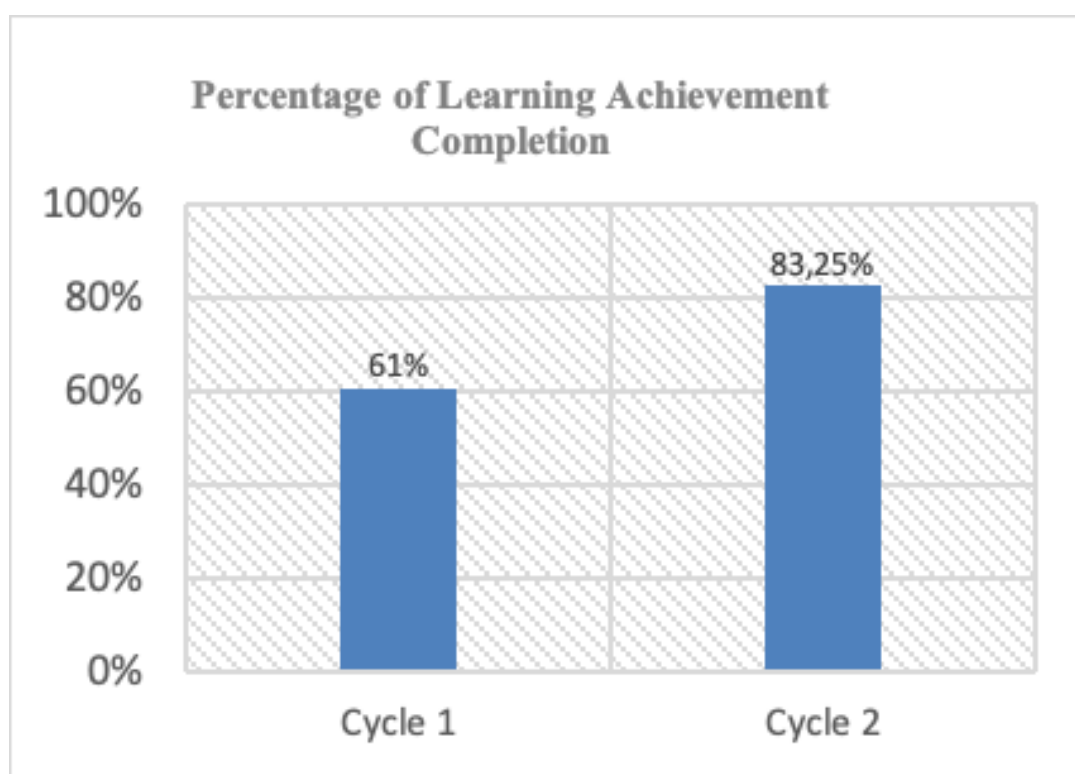


Figure 2. Histogram of Student Learning Achievement Results

Referring to the table of student learning achievement information, it can be seen that student learning achievement has increased and has met the success indicators. The average score in cycle I was 66.9 and in cycle II it was 76.25. The percentage of student learning achievement in cycle I was 61% and in cycle II it was 83.25%. Based on the findings presented, it can be concluded that the implementation of the problem-based learning model assisted by the KOKAMI media can improve students' academic

performance. This is evidenced by the fact that the scores obtained by the students have met the minimum competency standards (KKM).

Discussion

Based on the findings above, it can be concluded that the problem-based learning model assisted by KOKAMI media can enhance student learning activity. This statement is supported by the scores obtained from the observation sheets. This opinion is reinforced by investigations conducted by (Setyawati et al., 2019), (Umi Khotijah & Nisa Syuhda, 2021), (A. Kartikasari, 2019) which explain that after the implementation of KOKAMI media, student activity can be increased.



Figure 3. Mystery Card Box Media (KOKAMI)

Kokami (Mysterious Card Box) is a type of media combined with language games. Kokami media is a combination of games and media (Dhanar Rafida, Desy Safitri, 2024) RAFIDA. Kokami game media is an alternative that stimulates more active learning and attracts students' attention from boredom. Kokami media is a combination of media and games. Kokami media serves as an alternative that not only imparts knowledge to students in an engaging and memorable way but also stimulates their interest and attention. Kokami media aims to attract students' interest in participating in the learning process and impart knowledge to them (Choirunnisa & Sundi, 2024). As the name suggests, Kokami consists of a box containing various message cards. These messages can be commands, questions, and punishments written on pieces of cardboard and placed in sealed envelopes. These cards are an important component in games using Kokami media, as they contain the direction of teaching and learning activities.

The Kokami medium has several advantages: its tools and materials are simple and inexpensive, it is easy to make, its design is straightforward, and it is easy for both teachers and students to use. With these advantages, this medium can be created and used by teachers as a tool to assist in the learning process. It is hoped that this medium will serve as a solution to the challenges faced by both teachers and students, making learning more engaging and enjoyable. These results reinforce previous research by (I. Kartikasari et al., 2021) which showed an increase in cooperation among students because they were actively involved in group activities during discussions and actively participated in learning activities using the PBL model and KOKAMI media. Teachers implemented a series of lessons based on teaching tools and improved their teaching methods, resulting in increased student activity in each meeting.

The results also show that the application of the PBL model with KOKAMI media can improve students' mathematics learning achievement. This finding reinforces previous research by (Septiana et al., 2019) (Anazifa, 2016) (Laelisqiah et al., 2021) (Rahmat, 2018) which show that the implementation of the problem-based learning (PBL) model can improve student learning achievement. The use of PBL learning activity steps, which include focusing on students' problems so they can hear explanations from teachers, organizing students to learn so they can prepare tasks to be completed, and providing individual and group investigation guidance so students can seek information through experience, can increase activity and thematic learning outcomes. Students' comprehension skills have a significant impact on how effectively they achieve the minimum competency standard (KKM).

The purpose of evaluation is to determine students' positive achievements after a series of learning activities to assess whether they have succeeded or failed in learning. Academic achievement can be seen as the results obtained from the learning activities that have been carried out. In line with this, according to (Gusmawati et al., 2020) learning achievement is the result obtained through practice and experience accompanied by understanding. Therefore, learning achievement is the result of modifications to the series of learning activities. Thus, it can be concluded that the series of learning activities that continue to develop in each cycle influences the development of students' learning achievement.

The implementation of the PBL model has proven to be effective in increasing student engagement in learning while improving their academic performance. This shows that

PBL not only increases learning motivation but also has a positive impact on students' conceptual understanding and academic achievement. By encouraging students to actively engage in learning through direct experience, PBL can help students better understand concepts and apply them to new problems. (Mahmud Muhammad Sofwan, 2023), (Kriswandani & Kusuma, 2025), (Khoirunnisya et al., 2024), (Putria & T, 2024). The combination of PBL and KOKAMI creates a more meaningful learning experience, making students feel that mathematics is closer to their daily lives and no longer perceived as difficult or boring.

Based on the research conducted, fifth-grade students at SD Negeri Buntu 02 can become more active and achieve higher academic performance. Therefore, the KOKAMI-assisted Problem-Based Learning model is effective in increasing student activity and academic performance in mathematics lessons. The limitation of this study is that it was only conducted in one class at one school, so the results cannot yet be generalized to a broader student population or schools with different characteristics.

Conclusion

Based on the research results, it can be concluded that the application of the Problem-Based Learning (PBL) model with the help of KOKAMI media has proven to be effective in increasing the activity and learning achievement of fifth-grade students at SD Negeri Buntu 02. Student engagement increased from an average of 2.19 in Cycle I to 3.19 in Cycle II, while academic achievement rose from 66.90% to 76.25%. Additionally, learning completion rates also saw a significant increase from 61.00% in Cycle I to 83.25% in Cycle II, even exceeding the success indicator target of 75%. The results of this research reflect that the implementation of the Problem-Based Learning model supported by KOKAMI media not only enhances student engagement but also drives the achievement of academic performance that exceeds the success indicator target.

A more meaningful, interactive, and student-centred learning process has proven to be a key factor in maximizing students' learning potential. This success also underscores the importance of innovative teaching methods and media tailored to students' characteristics to create a more effective and enjoyable learning environment. Recommendations for future research suggest exploring the application of KOKAMI media across various subjects or themes with differing levels of complexity to assess the consistency of its effectiveness. Additionally, more comprehensive assessment

instruments that integrate qualitative approaches should be developed to capture changes in students' attitudes and engagement more deeply. Thus, future research outcomes are expected to provide a complete and more comprehensive picture.

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